chips.

[0004]

PCT/JP 2015/000171 discloses a card game monitoring system which determines whether chips placed on a game table are collected or repaid as a win or lose result by performing an image analysis on a movement of chips and monitors a fraudulent act.

[0005]

In the game hall such as the casino, the game table is recorded by the surveillance camera, and when the amount of money won at a time by a game participant is large, the recorded VTR is played to confirm whether or not there is a fraudulent act. However, there is a problem that fraudulence such as sophisticated fraudulence acts in a game table and continuous winning of a small amount of money cannot be found by simply detecting that the game participant wins the large amount of money. In addition, the related art does not sufficiently prevent a fraudulence act by collusion of a dealer and a player.

[0006]

The present disclosure seeks to prevent damage due to a fraudulent act by continuously monitoring an amount betted by a game participant and win or lose of a game, comparing data of a probability statistic calculation or past statistical data, and detecting a suspicious pattern suspected of being fraudulent.

[0007]

A fraudulence

monitoring system of a table game according to one aspect of the present invention includes: a win and lose determination device which determines win and lose results for each game in a game table; a bet chip measuring device which grasps an amount of game tokens that a game participant bets on the game table in each game; and a management control device which stores the number of games performed on the game table and specifies positions and the amount of game tokens that the game participant places on the game table based on a measurement result by the bet chip measuring device in each game and stores the specified positions and amount of game tokens in each game participant or player positions of the game table, wherein the management control device includes a function which refers to a total number of games, a transition of bet chip amounts for each game, a win or lose result of each game, and a return amount obtained in each game for each game participant or player position as calculation basis and compares results of an actual winning rate and a total return amount in each game participant or player position at the time of an end of a predetermined number of games with figures obtained by a probability statistic calculation to determine whether there is a significant difference therebetween or not.

[0008]

The management control device may further include a function which specifies dealers in each game and include a

there is a significant difference based on the data of the spots from a series of games and enumerates the fraudulence cause with the possibility.

[0017]

The management control device may estimate the fraudulence cause determined that there is the significant difference using any one or both of big data on past games or past fraudulent data, and enumerate the cause with the fraudulence possibility.

[0018]

A fraudulence monitoring system of a table game according to another aspect of the present invention includes: an income and expenditure grasping device which grasps income and expenditure of a casino side for each game table in a plurality of game tables; and a management control device which stores the number of games performed on each game table and sequentially grasps and stores a transition of the income and expenditure of the casino side in each game, wherein the management control device includes a calculation function which compares results of the income or expenditure of the casino side with figures obtained by a probability statistic calculation at the time of an end of a predetermined number of games, on the basis of a calculation on a total number of games performed on each game table and the transition of the income and expenditure of the casino side in each game to determine whether there is a significant difference therebetween, and

specifies any one of the game table or a room having the game table where the significant difference is occurring.

[0019]

A fraudulence monitoring system of a table game according to another aspect of the present invention includes: a win and lose determination device which determines win and lose results for each game in a game table; a bet chip measuring device which grasps an amount of game tokens that a game participant bets on the game table in each game; and a management control device which stores the number of games performed on the game table and specifies positions and the amount of game tokens that the game participant places on the game table using a measurement result by the bet chip measuring device in each game and stores the specified positions and amount of game tokens in each game participant or player positions of the game table, wherein the management control device includes artificial intelligence having data of a past fraudulent game taught as training data, and further includes a calculation function which refers to a total number of games in each game participant or player position, a transition of bet chip amounts for each game, a win or lose for each game, and a return amount obtained in each game as calculation basis and determines whether a significant difference with fraudulence possibility occurs in any one of the game participant or player position, the game table, or a room having the game table at the time of an end of a predetermined number of games.

[0020]

The management control device may further include a function which specifies dealers in each game and include a function which specifies the dealer responsible for a series of games in which the significant difference occurs.

[0021]

The management control device may include a calculation function which factorizes the total return amount in a series of games in which the significant difference occurs to specify whether an occurrence cause of the significant difference in the series of games in which the significant difference occurs is due to the winning rate or due to a magnitude of a betted amount of a bet chip.

[0022]

The management control device may include a calculation function which stores the bet chip amounts for each game at the bet position having different return rates, and specifies whether the occurrence cause of the significant difference in a series of games in which the significant difference has occurred is associated with the bet position having different return rates.

[0023]

The management control device may have a plurality of criteria which determine whether there is a significant difference and issue a different kind of warnings for each criterion.

A fraudulence monitoring system of a table game according to another aspect of the present invention includes: an income and expenditure grasping device which grasps income and expenditure of a casino side for each game table in a plurality of game tables; and a management control device which stores the number of games performed on each game table and sequentially grasps and stores a transition of the income and expenditure of the casino side in each game, wherein the management control device includes artificial intelligence having data of a past fraudulent game taught as training data, and further includes a calculation function which compares results of the income or expenditure of the casino side with figures obtained by a calculation of the artificial intelligence having the data of the past fraudulent game taught as the training data on the basis of a calculation on a total number of games performed the respective game tables and the transition of the income and expenditure of the casino side in each game to determine whether there is a significant difference therebetween, and determines a possibility that fraudulence occur in any one of the game table or a room having the game table where the significant difference is occurring.

[0029]

A fraudulence monitoring program of a table game according to another aspect of the present invention includes: a win and lose determining step of grasping win

and lose results for each game in a game table; a bet chip grasping step of grasping an amount of game tokens that a game participant bets on the game table in each game; a game progressing, grasping, managing step of storing the number of games performed on the game table and specifying bet patterns of the game tokens that the game participant places on the game table using transition data of a bet chip in the bet chip grasping step in each game and storing the specified bet patterns in each game participant or player positions of the game table; and a step of verifying occurrence possibility of a fraudulence act, wherein the step of verifying the occurrence possibility of the fraudulence act includes a step of grasping and referring a total number of games in each game participant or player position, a transition of a bet chip amount, and a return amount for each game as a calculation basis, a step of calculating an actual winning rate and a total return amount of each game participant or player position at the time of an end of a predetermined number of games, a significant different determining step of comparing the obtained winning rate and total return amount with a winning rate and a total return amount based on a probability statistic calculation or past data to determine whether there is a significant difference therebetween in the predetermined number of games, and an abnormal spot determining step of specifying any one of the game participant or player position, the game table, or a room having the game table where the significant difference is occurring.

What is claimed is:

1. A fraudulence monitoring system of a table game, comprising:

a win or lose determination device which determines win or lose results for each game in a game table;

a bet chip measuring device which grasps an amount of game tokens that a game participant bets on the game table in each game; and

a management control device which stores the number of games performed on the game table and specifies positions and the amount of game tokens that the game participant places on the game table based on a measurement result by the bet chip measuring device in each game and stores the specified positions and amount of game tokens in each game participant or player positions of the game table,

wherein the management control device includes a function which refers to a total number of games, a transition of bet chip amounts for each game, a win or lose result of each game, and a return amount obtained in each game for each game participant or player position as calculation basis and compares results of an actual winning rate and a total return amount in each game participant or player position at the time of an end of a predetermined number of games with figures obtained by a probability statistic calculation to determine whether there is a significant difference therebetween or not.

2. The fraudulence monitoring system of a table game according to claim 1, wherein the management control device further includes a function which specifies dealers in each game and includes a function which specifies at least any one of a participant, a dealer, a player position, a game table, or a room having the game table of a series of games in which the significant difference occurs.

3. The fraudulence monitoring system of a table game according to claim 1 or 2, wherein the management control device includes a calculation function which factorizes the total return amount in a series of games in which the significant difference occurs to specify whether an occurrence cause of the significant difference in the series of games in which the significant difference occurs is due to the winning rate or due to a magnitude of a betted amount of the bet chip.

4. The fraudulence monitoring system of a table game according to claim 1 or 2, wherein the management control device includes a calculation function which stores the bet chip amounts for each game at the bet position having different return rates, and specifies whether the occurrence cause of the significant difference in a series of games in which the significant difference has occurred is associated with the bet position having different return

rates.

5. The fraudulence monitoring system of a table game according to claim 1 or 2, wherein the management control device has a plurality of criteria which determine whether there is a significant difference and issues a different kind of warnings for each criterion.

6. The fraudulence monitoring system of a table game according to claim 1 or 2, wherein the management control device has different determination criteria of a different significant difference for the number of games divided by a predetermined rule or for each of the predetermined number of games and issues a different kind of warnings.

7. The fraudulence monitoring system of a table game according to any one of claims 1 to 6, wherein the management control device determines whether there are significant differences for each game sequentially or every time the predetermined number of games is progressed in accordance with the progress of the plurality of games, and issues a warning when the determination criteria on the significant difference exceed.

8. The fraudulence monitoring system of a table game according to any one of claims 1 to 7, wherein the management control device has a plurality of criteria which

determine whether there is a significant difference and specifies the game participant or the player position having the fraudulence possibility for each criterion to be able to display scores for each different criteria and display scores or ranks for warnings.

9. The fraudulence monitoring system of a table game according to any one of claims 1 to 8, wherein the management control device obtains the figures obtained by the probability statistic calculation used to determine whether there is a significant difference based on a conditional probability calculation when a specific element is a fixed value.

10. The fraudulence monitoring system of a table game according to any one of claims 1 to 9, wherein the management control device further includes a function which sequentially grasps playing cards or spots of dice from a series of games, and estimates the fraudulence cause in the case in which it is determined that there is a significant difference based on the data of the spots from a series of games and enumerates the fraudulence cause with the possibility.

11. The fraudulence monitoring system of a table game according to any one of claims 1 to 10, wherein the management control device estimates the fraudulence cause

determined that there is the significant difference using any one or both of big data of past games or past fraudulent data, and enumerates the cause with the fraudulence possibility.

12. A fraudulence monitoring system of a table game, comprising:

an income and expenditure grasping device which grasps income and expenditure of a casino side for each game table in a plurality of game tables; and

a management control device which stores the number of games performed on each game table and sequentially grasps and stores a transition of the income and expenditure of the casino side in each game,

wherein the management control device includes a calculation function which compares results of the income or expenditure of the casino side with figures obtained by a probability statistic calculation at the time of an end of a predetermined number of games, on the basis of a calculation on a total number of games performed on each game table and the transition of the income and expenditure of the casino side in each game to determine whether there is a significant difference therebetween, and specifies any one of the game table or a room having the game table where the significant difference is occurring.

13. A fraudulence monitoring system of a table game,

comprising:

a win or lose determination device which determines win or lose results for each game in a game table;

a bet chip measuring device which grasps an amount of game tokens that a game participant bets on the game table in each game; and

a management control device which stores the number of games performed on the game table and specifies positions and the amount of game tokens that the game participant places on the game table using a measurement result by the bet chip measuring device in each game and stores the specified positions and amount of game tokens in each game participant or player positions of the game table,

wherein the management control device includes artificial intelligence having data of a past fraudulent game taught as training data, and further includes a calculation function which refers to a total number of games in each game participant or player position, a transition of bet chip amounts for each game, a win or lose for each game, and a return amount obtained in each game as calculation basis and determines whether a significant difference with fraudulence possibility occurs in any one of the game participant or player position, the game table, or a room having the game table at the time of an end of a predetermined number of games.

14. The fraudulence monitoring system of a table game according to claim 13, wherein the management control device further includes a function which specifies dealers in each game and includes a function which specifies at least any one of a participant, a dealer, a player position, a game table, or a room having the game table of a series of games in which the significant difference occurs.

15. The fraudulence monitoring system of a table game according to claim 13 or 14, wherein the management control device includes a calculation function which factorizes the total return amount in a series of games in which the significant difference occurs to specify whether an occurrence cause of the significant difference in the series of games in which the significant difference occurs is due to the winning rate or due to a magnitude of a betted amount of a bet chip.

16. The fraudulence monitoring system of a table game according to claim 13 or 14, wherein the management control device includes a calculation function which stores the bet chip amounts for each game at the bet position having different return rates, and specifies whether the occurrence cause of the significant difference in a series of games in which the significant difference has occurred is associated with the bet position having different return

rates.

17. The fraudulence monitoring system of a table game according to claim 13 or 14, wherein the management control device has a plurality of criteria which determine whether there is a significant difference and issues a different kind of warnings for each criterion.

18. The fraudulence monitoring system of a table game according to claim 13 or 14, wherein the management control device has different criteria of a different significant difference for the number of games divided by a predetermined rule or for each of the predetermined number of games and issues a different kind of warnings.

19. The fraudulence monitoring system of a table game according to claim 13 or 14, wherein the management control device has a plurality of criteria which determine whether there is a significant difference and specifies the game participant or the player position having the fraudulence possibility for each criterion to be able to display scores for each different criteria and display scores or ranks for warnings.

20. The fraudulence monitoring system of a table game according to any one of claims 13 to 19, wherein the management control device further includes a function which

sequentially grasps playing cards or spots of dice from in a series of games, and estimates the fraudulence cause in the case in which it is determined that there is a significant difference based on the data of the spots from a series of games and enumerates the fraudulence cause with the possibility.

21. The fraudulence monitoring system of a table game according to any one of claims 13 to 20, wherein the management control device estimates the fraudulence cause in the case in which there is a significant difference using the big data of the past game as an additional item and enumerates the causes with the fraudulence possibility.

22. A fraudulence monitoring system of a table game, comprising:

an income and expenditure grasping device which grasps income and expenditure of a casino side for each game table in a plurality of game tables; and

a management control device which stores the number of games performed on each game table and sequentially grasps and stores a transition of the income and expenditure of the casino side in each game,

wherein the management control device includes artificial intelligence having data of a past fraudulent game taught as training data, and further includes a calculation function which compares results of the income

or expenditure of the casino side with figures obtained by a calculation of the artificial intelligence having the data of the past fraudulent game taught as the training data on the basis of a calculation on a total number of games performed on the respective game tables and the transition of the income and expenditure of the casino side in each game to determine whether there is a significant difference therebetween, and determines a possibility that fraudulence occur in any one of the game table or a room having the game table where the significant difference is occurring.

23. A fraudulence monitoring program of a table game, comprising:

a win or lose determining step of grasping win or lose results for each game in a game table;

a bet chip grasping step of grasping an amount of game tokens that a game participant bets on the game table in each game;

a game progressing, grasping, managing step of storing the number of games performed on the game table and specifying bet patterns of the game tokens that the game participant places on the game table using transition data of a bet chip in the bet chip grasping step in each game and storing the specified bet patterns in each game participant or player positions of the game table; and

a step of verifying occurrence possibility of a

fraudulence act,

wherein the step of verifying the occurrence possibility of the fraudulence act includes:

a step of grasping and referring a total number of games in each game participant or player position, a transition of a bet chip amount, and a return amount for each game as a calculation basis;

a step of calculating an actual winning rate and a total return amount of each game participant or player position at the time of an end of a predetermined number of games;

a significant different determining step of comparing the obtained winning rate and total return amount with a winning rate and a total return amount based on a probability statistic calculation or past data to determine whether there is a significant difference therebetween in the predetermined number of games; and

an abnormal spot determining step of specifying any one of the game participant or player position, the game table, or a room having the game table where the significant difference is occurring.

24. The fraudulence monitoring program of a table game according to claim 23, wherein the step of verifying the occurrence possibility of the fraudulence act further includes a step of specifying dealers in each game and has a step of specifying the dealer responsible for the series

of games in which the significant difference occurs in the abnormal spot determining step.

25. The fraudulence monitoring program of a table game according to claim 23 or 24, wherein the step of verifying the occurrence possibility of the fraudulence act further includes the artificial intelligence learning step that learns data of a past fraudulent game as training data.

26. The fraudulence monitoring system of a table game according to any one of claims 1 to 11 and 13 to 21, further comprising:

a device which specifies the game participant of the game table from the information on a face authentication system, ID card used, or a credit card used.